

and prescribed fire) determine the species composition and structure of the midstory and understory. Areas that were most likely dominated by longleaf but have evolved to a loblolly component due to lack of fire are scattered throughout the North Carolina coastal plain and are generally in poor structural condition with a dense midstory and sparse to moderate understory.

**Threats.** In former longleaf pine stands now dominated by loblolly pine, fire suppression is the single most important factor causing deterioration in these woodlands. It has greatly increased the hardwood component of these stands and changed their structure as well as the vegetative species in both the understory and overstory. Acquisition can be a problem in these upland habitats because fewer grant options are available. The Natural Heritage Trust Fund and Recovery Land Acquisition Grants are good possibilities.

Habitat fragmentation has also occurred in some areas, although many former hardwood stands and pond pine pocosins have been converted to loblolly or slash pine plantations for timber production. Site suitability for commercial and residential development is one factor contributing to the habitat fragmentation threat. Pine plantation characteristics likewise complicate management of remaining stands. These plantations are well-suited for some fauna (prairie warbler, worm-eating warbler) but are not suitable to others (eastern fox squirrel, red-cockaded woodpecker) due to the lack of an open canopy layer, high stocking rate, and short rotation age.

These highly managed pine plantations also lack age diversity within stands, and few old growth stands are available. High grading of stands, lack of gap management, and overstocked stands are leading to a lack of structural diversity for many species. Roads

cause particularly high mortality to reptiles and amphibians.

### ***Dry Longleaf Pine Forest (LLP)***

**Description.** Longleaf pine habitats can range from moist to very well-drained sites, including mesic pine flatwoods, pine–scrub oak sandhill, xeric sandhill scrub, and coastal fringe sandhill. These types often grade into each other or occur as a mosaic on the landscape. Frequent fire maintains a canopy dominated by longleaf pine, an open midstory, and an understory dominated by wiregrass or other grassy and/or herbaceous ground cover. When fire is absent or infrequent, scrub oaks, other hardwoods, and shrubs become common in the midstory and shade out native grasses and forbs. The historical expanse of longleaf pine habitats likely supported stable populations of many early seral species without the understory of a mature or old growth pine forest. Longleaf pine is a very long-lived species, so the old growth component of this habitat type was very significant. Prescribed fire during the growing season needs to increase dramatically in these systems, and midstory reduction is essential.

*Coastal fringe sandhill communities* typically occur within a few miles of the coast on the central and southern North Carolina coastal plain. They have an open to sparse canopy of longleaf pine, scattered scrub oaks, abundant lichens and bare sand, and naturally experienced frequent low-intensity fire, except in areas with too little herb cover to carry a fire (Schafale and Weakley, 1990). Without fire, oaks and shrubs increase in dominance, leading to litter buildup and shading that reduces herb diversity. With long-term fire suppression, the litter buildup and changes in the microenvironment can allow invasion by more mesic species (Schafale and Weakley, 1990).